

Colorado Department of Health
Hazardous Materials & Waste Management Division
Comments
on
DRAFT
OU4 SOLAR EVAPORATION PONDS
INTERIM MEASURE/INTERIM REMEDIAL ACTION
ENVIRONMENTAL ASSESSMENT
DECISION DOCUMENT
U. S. DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
MAY, 1994

GENERAL COMMENTS:

The comments provided herein constitute a follow-up to informal comments on a "roundtable" review document presented to the Division in February, 1994. As such, the review of the formal draft document is intended to verify the incorporation of initial comments, resolve any lingering concerns of the Division, ascertain whether the comments of other parties as incorporated are acceptable, and thus ensure that the document is adequate for distribution to the public as a proposed closure action on the Solar Evaporation Ponds.

Executive Summary:

Page ES-1: At the sentence (seventh line from the bottom of the second paragraph) beginning with, "Phase II will consist of additional hydrological investigations..." strike the word "hydrological". Based on our roundtable review and comment, the Phase II Work Plan will need to include additional soil sampling unless specifically proposed in this IM/IRA DD.

Response Page ES-1: Will comply: DOE will make a global change from "additional hydrogeological studies" to "Phase II RFI/RI". DOE will prepare a discussion considering additional soil sampling outside OU4. The discussion considering additional soil sampling outside OU4 will be included in the Phase II work plan.

In the last sentence, second paragraph, add a reference to the RCRA Corrective Action Decision (CAD) as a concurrent action to the CERCLA Record of Decision (ROD).

Response: Will comply: a reference to a CAD will be included.

Page ES-2: In the first ordinary paragraph, DOE's intent to excavate contaminated soils beneath the proposed location of the engineered cover is not adequately described. The current language suggests, incorrectly, that only the soils outside the SEPs or beneath Pond 207-C would be excavated. Please modify. Also in the same sentence, change "engineered cover" to "engineered system;" and contaminated media" to "contaminated soils". A change to engineered system includes the proposed drainage layer, in general terms, without delving into details. "Contaminated soils" is a more precise description of the proposed action but does not require elaboration.

Response Page ES-2: The executive summary will be changed to specify that the soils beneath IHSS 101 will be excavated to the mean seasonal high water table elevation, and soils outside the IHSS within the remediation boundary will be excavated to the extent that Contaminant of Concern (COC) Concentrations exceed applicable Preliminary Remediation Goals (PRGs).

In the last two sentences of the first paragraph, delete "hydrogeologic".

Response: Will comply.

In the second paragraph, edit the second sentence to read, "The "cover component of the engineered system is based on research..."

Response: Will comply.

Page ES-3: The last paragraph must also specify that the cover also prevents direct contact with the waste and soils by human and ecological receptors.

Response Page ES-3: Will comply.

Section I.0:

Page I-2: In the first sentence, second paragraph, change "additional hydrological studies" to "a Phase II RFI/RI" This comment was made by the Division to the round table document but was not incorporated.

Response Page I-2: Will comply: See response to Comment #ES-1.

Section I.3:

Page I-19: In the second sentence, second paragraph, the statement is made that remediation will be deferred if the remediation actions "may" interfere with ongoing RFP activities. This should be modified to place emphasis on actions that may be taken versus actions that may not be logical or appropriate due to interference with plant operations. As now written, DOE would not have to close the ponds because the closure action would interfere with above and below ground utilities. Please rewrite the sentence to specific that all reasonable actions are being done as part of the proposed closure action.

Response Page I-19: The text will be modified to state that remediation will be deferred if it will interfere with necessary RFP operations. If deferred, remediation will be addressed when the RFP operations cease.

The last sentence, second paragraph, is slightly incorrect. The transfer from OU-9 to OU-4 was approved by the Division earlier in the year.

Response: The text will be modified to state that the CDH and EPA approved the annexation of OU9 lines (within the area of remediation) into OU4.

In the next to last sentence, third paragraph, change the "additional hydrological studies" to Phase II investigations.

Response: Will comply: See response to Comment #ES-1.

Section I.3.1:

Page I-19: At the third bullet, ARARs are presented in **Part III, Section 5.2**. Likewise at the fifth bullet Section IV.5 is Part IV, Section 5; however, this is an incorrect reference. IV.5 is entitled "Required Specifications". Is the consistency with the final remedy information in Part III? Neither the Part III or Part IV Table of Contents is explicit.

Response: The references will be corrected. The Consistency with the final Remedy is discussed in Part IV Section 11.5.

Section I.3.2:

Page I-20: The Division's comment to page 1-16, lines 12-13, of the round table review document have not been incorporated. In the second sentence, second paragraph, change "proposed final IM/IRA" to "Proposed IM/IRA". The proposed document is a "proposal" to the public, once their comments are received a "Final" IM/IRA DD is prepared by DOE for approval by the Division. **DO NOT** confuse the separate aspects of the documents. Once again, the document sequence is Draft, Proposed and Final not Draft Proposed (as this version has been entitled) or Proposed Final.

Response: Will comply.

Section I.4.6.2:

Page I-47: In the round table review document a Figure I.4.16 was presented. Although the figure was not a "Bedrock Geology Map" as captioned, in that it did not depict mappable geologic units, the Division indicated its desire that the map be retained in the document since it showed the bedrock topography. The Division now insists that the map be specifically included in Part I. Regarding the three mappable units discussed in the next to last line of page I-47, if the units are mappable then the Division insists that the map be included in Part I. There is no value in stating that units are mappable if a map is not provided.

Response Page I-47: The map will be returned to Part I. The map will be titled as "bedrock topography".

Section I.4.8:

Page I-51: The Division's "Necessary" comment to page 1-50, line 9, of the Round Table document may not have been addressed. The comment called DOE's attention to National Environmental Resource Damage (NERD) as an issue that must be addressed. The actions proposed in the IM/IRA, specifically removal of contaminated soils and the consequent effect upon vegetation and habit, could be impacted by NERD limitations or requirements. DOE must investigate this potential issue. (See our "Additional Comments to Part I 3/10/94" relative to the round table review document.)

Response Page I-51: Please see the response to round table review comments on Part III for a response to the NRDA issue.

Section II.1.3:

Page II.1-14: In the last sentence, third paragraph, Building 910 has not been used on a routine basis for the treatment of ITS water. To the Division's knowledge, ITS water has routinely been treated in Building 374. Building 910, however, remains available.

ES Response Page II.1-14: The text will be revised to indicate that ITS water was treated in Building 374 and that Building 910 was available for treatment, but not used routinely

Section II.2: The last sentence, last paragraph, of the section should be changed since Pond 207-C will not be cleaned out as scheduled. Instead indicate that DOE has committed to completing pond cleanout by January 20, 1995.

ES Response Section II.2: The statements referencing the scheduled cleanout dates for SEP 207-C will be revised in accordance with the most recent schedule.

Figure II.2-16: Specifically show, with an additional symbol, the location of the five wells that were equipped with data loggers.

ES Response Figure II.2-16: This figure will be revised to indicate which wells were equipped with data loggers and the dates over which water level measurements were made using the data loggers.

Section II 2.7.5: The statement on page II.2-77 is different from the statement in the roundtable review draft. This document states that duplicates and equipment reinspect blanks requirements were not met; whereas, the roundtable version states that they were obtained. It is the Division's understanding that duplicates were obtained but not at the appropriate frequency. DOE should discuss the potential of impact upon data quality and useability.

Response Section II.2.7.5: The text on page II.2-77 is awkward, will be revised, and will reference the appropriate sections in Part II.3 where more detail regarding the QA/QC results lies.

To the best of our knowledge, not meeting the field sample collection QA/QC requirements does not have a detrimental impact on the quality, useability, or reliability of the data. The duplicate sample Relative Percent Differences (RPDs) were within acceptable limits (with the exception of the chemical toluene), and it not expected that additional field duplicate samples would change this assessment.

It is acknowledged that the total number of equipment rinsate samples were not collected, but the analytical results for the samples that were collected indicate that equipment decontamination procedures were adequate to ensure that cross-contamination resulting from improperly decontaminated equipment is unlikely. Additionally, the presence of site contaminants in the equipment rinsate blanks were at sufficiently low levels that remediation decisions could not be influenced by possible cross-contamination of samples from improperly cleaned sampling equipment.

Section II.3.1.1.3:

The circular anomaly discussed in the third paragraph of page II.3-6 does not appear to have been addressed per the Division's comment on the roundtable document (re: page II.3-6, line 11). Please indicate the page number elsewhere in the DD that this anomaly is discussed and resolved or efforts that will be undertaken to allow resolution.

Response Section II.3.1.1.3: The "circular anomaly" described in Section II.3.1.1.3 refers to an approximately 35-foot, circular subsurface feature detected on three ground-penetrating radar (GPR) lines near Building 779. This anomaly may reflect an area of disturbed soils, possibly representing an excavated area associated with the Original Ponds or foundation construction associated with Building 779 or former Building T707. The area probably does not represent an underground storage tank or former tank excavation because of the diffuse GPR signature and

the shallow depth of the disturbed soils suggested by the GPR data. No additional data are available or planned to determine the exact nature of this circular feature.

Section II.3.1.1.4:

Page II.3.8: The reference to Pond 2B in the second full paragraph is still incorrect. Reference should be to Pond 2D. The caption to Figure 3.1-8 also remains in error (2B should be 2D).

Response 11.3.8: The reference to Pond 2B (and other references to Pond 2B) will be changed to Pond 2D.

Section II.5.3.2: The Division indicated in its comments on the roundtable document the necessity of providing a short explanation of the term "matric potential" now found in the third full paragraph of page II.5-21. This request had been made for the benefit of the public. While the Division does not intend that each and every scientific term be defined in the DD, there are selected terms that do warrant a brief definition. Matric potential is an example because "soil suction" or the "ability of the soil to pull in water", however one cares to express the concept, has meaning that matric potential clearly does not offer.

Other jargon like 2:1 clay and ± 3 sigma were among those that needed clarification. Is there, for example, anything improper about calling 2:1 clay a swelling clay?

Response Section II.5.3.2:

- 1). When soil water is at hydrostatic pressure less than atmospheric, a subpressure commonly termed tension or suction, the pressure potential is considered negative. A negative pressure potential is termed capillary potential or matric potential. The matric potential of soil water results from the capillary and adsorptive forces exerted by the soil matrix on pore water. These forces attract and bind water in the soil. However, soil water under negative pressure moves in response to varying pressure gradients.
- 2). ± 3 sigma refers to "the mean ± 3 standard deviations." This approach was used to determine whether chemical data were accepted or rejected. If a result exceeded the mean ± 3 standard deviations, the result was rejected.
- 3). A clay mineral is a fine-grained, crystalline, hydrous silicate with structures of the layer lattice type or "sheet silicates." The complex group of 2:1 clay minerals includes the micas, vermiculite, the smectite (or montmorillonite) group, pyrophyllite, talc, and various mixed-layer species. These clays are all based on a sheet structure consisting of two (2) tetrahedral layers with one (1) octahedral layer in between, i.e. "2:1." This structure allows the clay to swell through the uptake of moisture. The Division is correct in describing the clay as a "swelling clay," however, 2:1 clay is the correct technical term for these minerals.

Section II.3.4.1: For consistency and clarity of information, please provide a summary paragraph at the end of this section comparable to that in Section II.3.4.2, page II.3-271. Please check all such data presentation sections to ensure that either an interpretation or summary ES paragraph is presented.

Response Section II.3.4.1: A summary paragraph will be added. This paragraph will read:

"In summary, some of the inorganic, non-radiological PCOCs appear to be elevated either beneath or in close proximity to the SEPs with concentrations that appear to decrease with depth. Nitrate is broadly distributed throughout OU4, but the highest concentrations occur immediately beneath the SEPs and at the water table both in the vicinity of the SEPs and in the buffer zone. Cyanide was detected primarily in the immediate vicinity of the SEPs; however, sporadic detections above background occur in the buffer zone. The highest cyanide detections occur immediately beneath the SEPs in the 0-6 feet depth interval. The locations where cadmium exceeds background are directly beneath the SEPs and immediately north of SEP 207-A and SEP 207-B North at the drainage tile outfall. Some samples below 12 feet exceeded the background value for cadmium. Conversely, lithium was determined to be a PCOC by statistical methods but was not detected above background concentrations in any samples from OU4. Barium and zinc do not appear to have any apparent correlation with proximity to the SEPs, but a general trend of increasing concentrations of barium and zinc is suggested by the data."

Section II.4: A clear statement should be made in bold print that this section describes the nature and extent of contaminant releases from the SEPs but that the degree of cleanup will be limited to acceptable risk levels or background, whichever ever is applicable, rather than to pre-release levels. A reference to the subsequent PRG discussion would also be appropriate.

Response Section II.4: The first paragraph of Section II.4 will be rewritten as follows. To evaluate the impact of releases from the SEPs on the surface and vadose zone (subsurface) environments, an evaluation of the nature and extent of contamination was prepared and is discussed in this section. Cleanup activities associated with the IM/IRA will be conducted based on the extent determination, but the degree of soil remediation will be limited to acceptable risk levels or background, whichever ever is applicable, rather than to pre-release concentrations. Discussion of the nature and extent of contamination is limited to the PCOCs determined as part of the IM/IRA (Section III.2.1 and Appendix III.B). Both the horizontal and vertical extent of contamination was determined to provide an understanding of the three-dimensional distribution of contaminants in the surficial and vadose zone soils. These correlated analyses and evaluations considered specific criteria including: **The bulleted list that follows this text needs no changes.**

Section II.4.3: Regarding the last sentence, first paragraph on page II.4-4, the Division has merely allowed the use of the Rock Creek data in lieu of background data which the Division has repeatedly asked DOE to develop. DOE must not infer that the Division has determined the Rock Creek data to represent background for surficial soils. Rewrite the sentence to correctly represent the current situation.

Response Section II.4.3: The first paragraph will be rewritten to reflect CDHs' above comment. The paragraph will be changed as follows.

Phase I RFI/RI and historical OU4 data were compared to available surficial and vadose zone soil data outside of OU4 to evaluate the nature and extent of contamination at OU4. The Phase I RFI/RI surficial soil data for inorganic compounds and radionuclides were compared to data from the Rock Creek surficial soil study conducted by DOE as part of the site-wide background data evaluation. The Phase I RFI/RI and historical subsurface soil data were compared to background data for the Rocky Flats Alluvium that were identified in the Background Geochemical Characterization Report (EG&G, 1993). Data from these two studies were considered to be the most acceptable soil data for comparison to OU4 soils.

Figure II.4.4-23: In the title block, change "Extend" to "Extent".

Response Figure II.4.4-23: The figure will be changed as requested by CDH.

Section II.4.5.2: Under the headings for Acetone, Methylene Chloride, Bis(2-ethylhexyl)phthalate, and Toluene, pages II.4-59, 61 and 63, the bullet list of reasons precedes the sentences that indicate that the results may represent laboratory or secondary contamination. Please correct these sections.

Response Section II.4.5.2: The referenced paragraphs will be corrected so that the sentence introducing the suggested reasons for laboratory contamination precede the listed reasons.

Section II.4.5.4: The last sentence, under the heading "Cyanide", page II.4-82 is incomplete.

Response Section II.4.5.4: The last sentence will be rewritten as follows:

The extent of cyanide in the vadose zone is shown on Figure II.4.5-20. The most extensive occurrence of cyanide is found at depths between 0 and 6 ft bgl in the areas beneath Ponds 207 A and 207 B North. Cyanide occurs at deeper depths in the northeast corner of Pond 207B North (between 6 and 12 ft bgl) and at two boring locations (at depths greater than 12 ft bgl) situated along the northern boundary of OU4.

Section III.1: Add CHWA at the top of page III.3.

Response Section III.1: Will comply.

Section III.2.2.1: The Division will not agree to the public release of this document until DOE directly refers to the Phase II RFI/RI (See next to last sentence of the section). Although the primary focus of the investigation is hydrogeologic investigation, the overall focus under RCRA and CHWA is corrective action relative to releases from the ponds. Since these releases were to soils and groundwater, any soil contamination above risk based levels derived from the ponds, must either be addressed under the closure action or under corrective action. Therefore, it is imperative that DOE recognize, and convey to the public, the full purpose and nature of the

second phase of activity. If DOE believes that the Phase I investigation has fully delineated soil contamination and no further investigation of soils is warranted, it must clearly convey and support that conclusion in the document. As an alternative, the Division will accept a plan within the document to verify that all "above risk level" soils attributable to the ponds, including any beyond the OU boundary, will be excavated. Only then will the Division agree to limit the Phase II to hydrogeologic investigations.

Response Section III.2.2.1: The term "Additional hydrogeologic studies" with "Phase II RFI/RI" to comply with the comment. The scope of the Phase II work is generally discussed in Part I of the IM/IRA-EA Decision Document. DOE will propose a plan (if necessary) to characterize the soils outside the OU4 boundary to complete the nature and extent of contamination resulting from the Solar Evaporation Ponds. The plan for additional characterization outside the OU4 boundary may be limited to surface soil sampling because there has not been any vadose soil contaminants of concern identified at concentrations that exceed PRGs. The analytes that may be sampled for will include those OU4 Contaminants of concern that are identified near the OU4 boundary. The presentation of the plan will be provided in the Phase II Work Plan.

Section III.2.2.1.1:

Page III-10: In the next to last sentence of the first paragraph, change "additional hydrological investigation" to Phase II RFI/RI per the previous comment on Section III.2.2.1.

Response Page III-10: Will comply: See the response to comment #ES-1.

Section III.2.4.4: In this section DOE proposes to excavate contaminated soils to the "mean historic high ground water elevation or until a level of contamination is reached that is ... determined to be protective of ground water." Near the end of the section it is stated that catastrophic dissolution and MYGRT models can be performed to estimate a concentration in soil that will result in a ground water concentration at or below the applicable ground water criteria. The Division believes that empirical leachability data, as discussed in team meetings, will be needed in addition to modeling information to support an appropriate level unless concentrations in the soils drop to levels at or below the applicable ground water standard. Unless DOE plans to excavate to such stringent levels, it must propose and gain Division and EPA acceptance on the leachability method to be performed.

Response Section III.2.4.4: The initial part of the Section will be changed to indicate that the soils beneath the IHSS will be excavated to the mean seasonal high water table elevation. Soils outside the IHSS will be excavated to PRG concentrations. The section referencing the potential use of computer modeling to reduce the necessary amount of the excavation will be deleted. It was previously included because the U-238 PRG was exceeded in the north hillside vadose zone soils at concentration that were suspected to be reflective of site specific background. Since the standard HEAST toxicity values for U-238 were published incorrectly, ES has re-calculated the U-238 PRG. The hillside vadose zone soils no longer exceed the PRG. Therefore, vadose zone U-238 remediation is not required on the north hillside and modeling is not necessary. Since

DOE is excavating soils beneath the IHSS the mean seasonal high water table elevation, leachability testing should not be required to close the surface impoundments. Any soil leachability testing for the protection of groundwater should be a Phase II activity in combination with the Baseline Risk Assessment.

Section III.3.2: The Division considers the Pond Liners to be hazardous waste through application of the mixture rule 6 CCR 261.3 (a)(2)(iv) not the derived from rule. The liners are not derived from hazardous waste they are mixed with hazardous waste since leakage occurred through the liners.

Response Section III.3.2: Will comply.

Section III.3.3.2: In the last sentence, second paragraph, change "interim" to initial. Since the document is entitled an Interim Measure/Interim Remedial Action use of "interim" in the context of this paragraph is inappropriate and potentially confusing to the public.

Response Section III.3.3.2: Will comply.

Section III.5.2:

Page III-98: In the last paragraph, the statement is made that, with the exception of GRA I, each GRA under consideration will comply with their respective ARARs/TBCs. However, in the last sentence of the same paragraph, the statement is made that Section IV.11 contains the strategy to achieve compliance with or justification to waive the ARARs for the preferred IM/IRA. These two statements appear to be contradictory; if the ARARs can be met why is there a need to justify any waivers? Please revise as necessary.

Response Page III-98: The text will be revised to delete "or justification to waiver" because the preferred IM/IRA does not require any waivers.

Section IV.2.2:

Page IV-12 & 13: Regarding design requirement IV.2.2.4 & IV.2.2.9, DOE has not yet demonstrated, nor has the Division determined, that waste from demolition of Building 788 (RCRA Units 21 & 48) can be deemed remediation waste for the purpose of inclusion in the CAMU. The Division does not concur with DOE's espoused position that inclusion of the Building 788 closure in this IM/IRA Decision Document constitutes the incorporation of a regulated unit into the CAMU and therefore qualifies the waste as remediation waste. The inclusion of the Building 788 closure was merely to expedite and streamline the closure process; Building 788 remains a separate closure action. Until this issue is resolved the extent of inclusion of Building 788 debris, except that expressly OU-4 (including e.g. the former OU-9 Old Process Waste Lines), is disallowed.

Regarding design requirement IV.2.2.9.1, page IV-13, the underground utilities probably will be excavated concurrent with vadose zone soil excavation and drainage layer construction,

therefore, final disposition options, other than abandonment and closure in place, are possible. These utilities, to the extent they are physically located in the zone of remediation (i.e vadose zone) of contaminated soils, are remediation waste. DOE must not construe that contaminated components from Building 788 may be disposed in the same manner. Waste from Building 788 are not remediation waste. This design requirement may need to be rewritten since "in-place closure equipment and materials" and grouting of underground lines may no longer be applicable or only partially applicable.

Response Page IV-12 & 13: The response to this comment will be dependant upon the outcome of the dispute resolution. If it is agreed that Building 788 debris is remediation waste and enhances the closure design, then this information/justification will be added to the text. If Building 788 debris is not considered to be remediation waste, then the text will be modified to remove the references to dispositioning this debris beneath the engineered cover.

With respect to the discussion of in-place closure of utilities, it is unlikely that this methodology will be used. However, until the footprint of the engineered cover is finalized and the utilities verification work is completed. The document will maintain the discussion to provide DOE with closure flexibility.

Section IV.3.1.1:

Page IV-23: In the fourth paragraph, please refer to a possible upgradient interception trench as UIT, UITs or any acronym other than ITS to avoid confusion with the current ITS.

Response Page IV-23: Will comply: The acronym UITs will be used.

Section IV.3.2:

Page IV-58: Regarding the second paragraph of this section, the waste generated from the closure of RCRA Units 21 and 48, or from Building 788, do not constitute "remediation waste" since the closure of the units and demolition of the building do not constitute corrective action as the term "remediation waste" is defined in the preamble to the CAMU rule. Meeting minutes of the OU-4 IM/IRA Team Meeting dated April 12, 1994 are correct in suggesting that B788 and RCRA unit wastes can be considered remediation waste if management of the waste in a CAMU constitute an enhancement to the facility. Since DOE has yet to demonstrate that management in the CAMU will enhance effective, protective and reliable remedial actions for the facility, the Division will not approve the inclusion of the B788 materials into the CAMU.

Response Page IV-58: See the response to the comment numbered IV-12 & 13.

Section IV.6.3: This section states that construction should be completed in June, 1997; however, Figure IV-6.3, Activity ID 11000, states that the early finish for installation of the engineered cover will occur on December 10, 1997 with follow-up activities through July, 1998. At face value these dates are not consistent. Please verify or revise as necessary. The Division

retains the right to revisit and approve the final schedules to be incorporated in the Title II Design document.

Response Section IV.6.3: The text will change to indicate that the remediation completion date will be December 1997. The remaining scheduled activities include demobilization and start-up of the post closure monitoring system. Start-up is not typically considered an installation activity.

Section IV.6.5:

Page IV-99: Regarding the use of PRGs to limit the excavation of the Pond C vadose zone soils (top of page), DOE has yet to develop PRGs that would be at levels protective of ground water resources relative to state standards. Given the potential for catastrophic dissolution of nitrates, is a PRG possible? Please reconsider the use of a PRG limiting factor. It appears DOE should plan to excavate to the water table due to the difficulty of demonstrating appropriate PRG levels.

Response Page IV-99: Under SEP 207-A, SEP 207-C and the 207-B series SEPs (IHSS 101) the excavation will cease when the mean seasonal high water table elevation is encountered. Outside of the IHSS soil remediation will pursue to the PRG (target level) concentration within the OU4 remediation area.

Table IV.11-2:

Page IV-186: In the Implementation/Compliance Strategy paragraph relative to Part 2 Requirement, 2.4.2, the word "between" should be changed to "'beneath' the hazardous waste".

Response Page IV-186: Will comply.

IV.11.5: The first paragraph of this section continues to refer follow-up hydrological studies rather than as the Phase II work plan. Also, the document is still referred to as Part VI of the document rather than as a separate document.

Response IV.11.5: See the response to comment ES-1. ES will replace references to the Part VI with references to the Phase II RFI/RI.

Section V.5.1.4: DOE is reminded that the August 14, 1990 detailed working schedule of the IAG provides for a performance assessment report five years after implementation of the pond closure. Page V-53 discusses an initial monitoring phase of three years and a secondary phase of ten years. Since the text, last full paragraph of page V-53, suggests that the initial three year effort will allow DOE to determine the appropriate time of year to attempt to collect pore liquid samples, a report at the five year mark is remains reasonable. Please refer to this IAG reporting requirement in this section and other sections as necessary. The post-closure and monitoring permit when issued will specify a delivery milestone for this assessment report.

Response Section V.5.1.4: Not applicable.

Section V.5.2.4: All references to future actions by, or submittals to, the Colorado Department of Health should reflect the revised name "Colorado Department of Public Health and Environment" effective July 1, 1994. References to past actions by the department may include "formerly the Colorado Department of Health".

Response Section V.5.2.4: Not applicable to the IM/IRA. Future references will be made to CDHE.

CDHE comment on Figure III.0-1 In the "Risk Analysis" section of the flowchart, the risk assessor "Calculates modified PRGs (for each Potential COC) at Cumulative Risk of 1.0×10^{-6} per Organ." This follows with the CDHE draft policy, but, as we have noted in verbal comments on the policy, IRIS and HEAST do not provide cancer risk estimates for specific organs. The number reflects a general risk of cancer. Organ specific affects should be limited to qualitative discussions.

Response Figure III.0-1: Refer to telephone conversation occurring on 10/27/93 between Harlan Ainscough (CDHE) and Phil Nixon (ES) stating that "target organs may be addressed individually while modifying the PRGs. For example, if 5 carcinogens affect the liver, and 4 carcinogens affect the kidney, then the PRG for the liver carcinogens will be modified by dividing the target risk by 5, and the kidney carcinogens will be divided by 4." This conversation was a result of consultation between Harlan Ainscough and Joe Schieffelin (CDHE) and subsequent discussion between CDHE and Alexis Fricke (ES) on 10/27/93. In summary, CDHE suggested this approach and it is consistent with EPA guidance therefore the comment is inappropriate.

Section III.2 Figure III.2-1a: In the "Exploratory Data Analysis" section, a box reads "Compare OU4 RFI/RI Data to historical Data using Nonparametric Tests." If the distribution of the data is normal, a parametric test can be used and, most likely, will have more statistical power than a nonparametric test.

Response Figure III.2-1a: As part of the approved Gilbert methodology (refer to the working team meeting notes from October 20, 1993) nonparametric tests were employed to minimize work in defining populations before comparisons.

Section III.2.1 In the "Statistical Evaluation" section, analytes are eliminated from consideration if they do not meet the statistical evaluation for PCOC selection. In the "PRG Development" section, analytes are eliminated if they exceed PRG or Background comparison. In both instances, environmental characteristics of the analytes are not considered. Does the analyte degrade into something more toxic? bioaccumulate? or interact with other chemical to become more or less toxic?

Response Section III.2.1: The approved Gilbert Methodology does not include environmental characteristics as an analysis component. However, a qualitative review was completed during

the PCOC selection process to account for environmental characteristics (i.e., additional criteria used to re-evaluate statistical results). A thorough analysis of PCOC environmental characteristics was also conducted in determining which PCOCs would be modeled using VLEACH, MYGRT, and HELP (see Part IV, Section 10.4).

Section III.2.2.1.1(Pathways of exposure): VOCs in the vadose zone soils were detected at low concentrations. What were the detectable levels and what criteria were used to define low concentrations? A quantitative comparison should be made.

Response Section III.2.2.1.1: Refer to Part II, Section 3.4, specifically Table II.3.4-5 and Figures II.3.4-52 through 60 for information on detection limits for organics PCOCs in vadose soils. In a few cases, VOCs were only detected using pre-RFI/RI data with concentrations reported as detection limits. As no controls were placed on data collected under earlier programs, these values could be JDLs, MDLs, PQLs, RQLs, or CRQLs. This data was used conservatively by assuming if it was not identified as a nondetect, it was a detect.

Section III.2.2.1.1 (Pathways of exposure): Default values for dermal absorption were determined by adopting absorption factors from similar chemicals. However, dermal absorption factors are defined both by the chemical and by the type of dose administered in the critical study form which a toxicity value was calculated. For example, if a dose was administered orally, the factor would always be 1.0.

Response Section III.2.2.1.1: The methods used for developing dermal absorption values are described in Part III, Section 2.2 CDHE's comment is unclear as to whether the methods and/or the absorption values are inappropriate.

Section III.2.2.1.3 (Calculation of Preliminary Remediation Goals): PRGs were calculated for PCOCs in surficial soils only. For a residential scenario, PRGs for vadose zone soils should also be calculated because of the existence of basements and crawl spaces, and the use of vadose zone soils in landscaping.

Response Section III.2.2.1.3: PRGs were calculated for vadose zone soils (see Table III.2.3). Vadose Zone Soils PRGs were calculated only for a worker exposure scenario pursuant to RAGS. To consider residential exposure to vadose zone soils is contrary to RAGS and completely insupportable. (Also, refer to item 6 of the working group's meeting notes from November 9, 1993 for further clarification.)

CDHE comment continued: Also, as mentioned in comments on Figure III.0.1, IRIS and HEAST do not provide cancer risk estimates for specific organs. The number reflects a general risk of cancer. Organ specific affects should be limited to qualitative discussions.

Response: See response to Figure III.0.1.

Table III.2-3 (Summary of COCs based on Risk Analysis): This table needs to provide the detection level, detection frequency, and the range of detections. Otherwise, the reviewer

cannot determine whether or not the risk assessor selected appropriate statistical tests or sufficient statistical power.

Response to Table III.2-3: This information is provided in Appendix III.A. The text will be modified to state that Appendix III.A includes the detection level, detection frequency, and the range of detections in OU4. The statistical tests are appropriate as discussed earlier under Gilbert methodology.

Section III.2.4.4 (Defining Areas of Concern): What is the technical rationale for excavating contaminated surficial soils within the OU4 boundary (north of the SEPs) to 6-inches bgs.?

Response to Section III.2.4.4: The minimum amount of soil that can be effectively removed by a bulldozer was estimated at six (6) inches. This is conservative in that the surface soil samples were taken at a depth of 3 inches.

CDHE comment continued: It is not clear why the method of determining the areas of concern provides a very conservative estimate of the extent of contamination actually present and why it will provide a conservative estimate of the actual extent of contamination.

Response: The area of concern is based on concentration point to point extrapolation and not on actual concentration contours. We subdivided areas into excavation zones based on these point to point estimates. Thus, for example, the disposition of the material underlying the SEPs and the berms was determined by a few sample points. If one sample in a berm was above the PRG, the whole berm was identified for removal. This approach is conservative as it assumes mass contamination rather than point-source problems. This rationale will be added to the text of the IM/IRA.

Appendix III.A Figure III.A-1: If the analyte concentrations are significantly different than background data, what criteria will be used to re-evaluate the results.

Response Appendix III.A Figure III.A-1: Refer to the statistical methods described in Appendix A. Additionally, see response to Section III.2.1.

Appendix III.A: The frequency histogram graphs should be redone using standard scales. When the scale for the analyte is different than the scale used for the background data, comparisons are difficult. The scales seem arbitrary and misleading.

Response Appendix III.A: The analyte data plots will be regenerated on the same scale as the background data. However, this may make it difficult to read data from one population. The scale was selected to provide the most resolution for the data set.

Section III.A.3 (Exploratory Analysis): The text states that,

"Non-detect values were only replaced with one-half the reported result before computing summary statistics for each analyte suspected to represent site contamination."

Figure III.A-1 indicates that the summary statistics were conducted several steps before the non-detects were transformed into one-half of the detection limit. Which method was actually used?

Response Section III.A.3: The text statement is the correct method and the one used when generating statistical information. The figure will be revised to clarify the procedures followed.

Table III.A: It seems odd that none of the chemicals listed have historical evidence indicating the presence of the analyte. What historical sources were reviewed?

Response Table III.A: A list of historical data reviewed can be presented and Table III.A will be modified to further explain the issue of historical data. The current notation in these tables only means there is no definitive evidence of that particular chemical being placed in the SEPs, although site-wide data may support its presence. Detailed records of material pumped/placed into the SEPs over time have not been identified. However, the analyte list developed for Phase I was based on some type of historical review of possible sources. Since Phase I RFI/RI data was used as the primary source of data, based on the uncertainty associated with the historical data all chemicals included in the initial evaluation to identify PCOCs may have been present at some period at the site. Refer to the position paper (November 11, 1993) on use of historical data discussed at the team meeting on November, 1993.

CDHE comment continued: If there is not enough data to calculate a 99% upper tolerance limit for background surficial soil analytes, why have CDHE, DOE, and EPA expended so much time, energy, and money on developing a methodology for background comparisons that cannot be applied? Our resources could be better spent collecting more data that would enable us to conduct statistical tests with greater confidence.

Response: Calculation of a nonparametric 99 UTL requires 59 samples or more; otherwise, one must default to the maximum value. However, this value is only used as an initial screen. The methodology that has been developed by CDHE, EPA, and DOE consists of other tools that can be applied to the background surficial soil data set. The text describes how these other, more statistically powerful tools (such as the Gehan test, etc.) were used to identify surficial soil PCOCs. Unfortunately, since this project is on an accelerated IAG schedule there was not adequate time to collect additional background samples.

Table III.A-12: Why were gross beta, Radium-226, Radium-228, Strontium, and gross alpha not considered potential COCs?

Response Table III.A-12: Table III.2-3 presents PCOCs including Radium-226 and Strontium (as a metal and isotope). Gross alpha and gross beta measure radiation from all radionuclides present. Only chemical-specific radiation is appropriate for PCOC development. Radium-228 and any other radionuclide not listed as a PCOC were screened out in Table III.A-13 or were not analyzed for in the field studies. Refer to Appendix A for further detail.

Table III.A-14: Why were so few chi-square tests done for lognormally distributed data?

Response Table III.A-14: Chi-square tests were conducted on all PCOC data to determine distribution. In many cases the test could not be completed on the lognormally transformed data due to data inadequacies or limitations (number of datum, degrees of freedom, etc.). In these instances, the data were assumed to fail the chi-square test for goodness-of-fit to a lognormal distribution. However, the K-S goodness-of-fit test was also performed on the transformed data and evaluated separately from the chi-square test to determine the data distribution.

Table III.B-7: As of 2/16/94, the RfD value for Aroclor-1254 is under review. How was the value submitted derived?

Response Table III.B-7: All toxicity data used was taken from the TOMESTM database (Micromedex, 1994) using the 1/31/94 updated information. Therefore, the RfD for Aroclor used in the IM/IRA risk analysis is the one that was subsequently placed under review.

Appendix III.C: Many of the chemical profiles for potential contaminants of concern refer to Ohio state standards and Ohio state methodologies (see barium, beryllium, bis(2-ethylhexy)phalate, etc.). This information should be derived from Colorado standards and policies.

Response Appendix III.C: The chemical profiles for PCOCs will be modified to reflect Colorado standards and policies where appropriate.